Future Directions
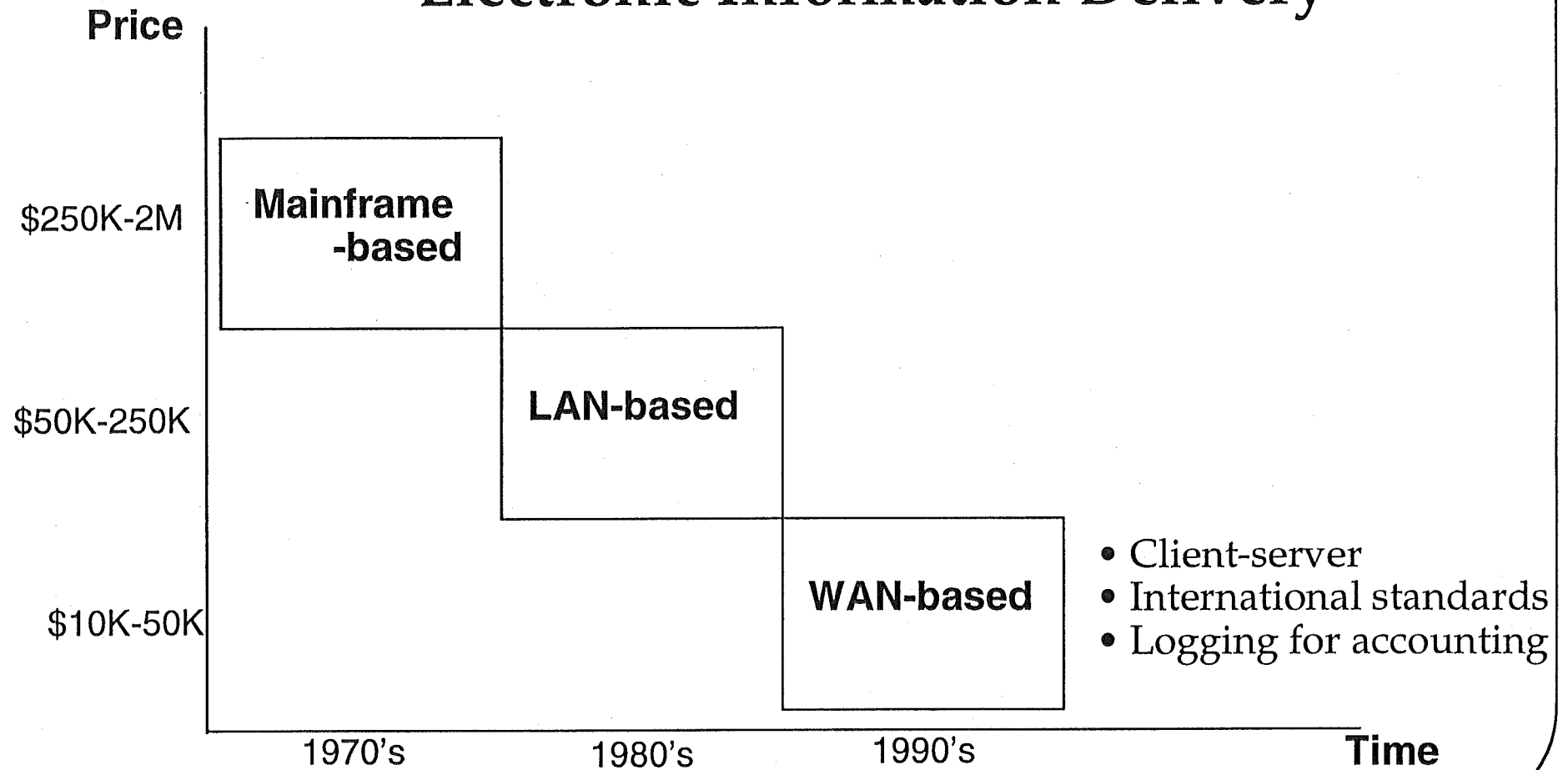
- Servers: Integrate Gopher, Web, and WAIS Capabilities

- Protocols: Working on Standards Committees and Protocol Toolkits

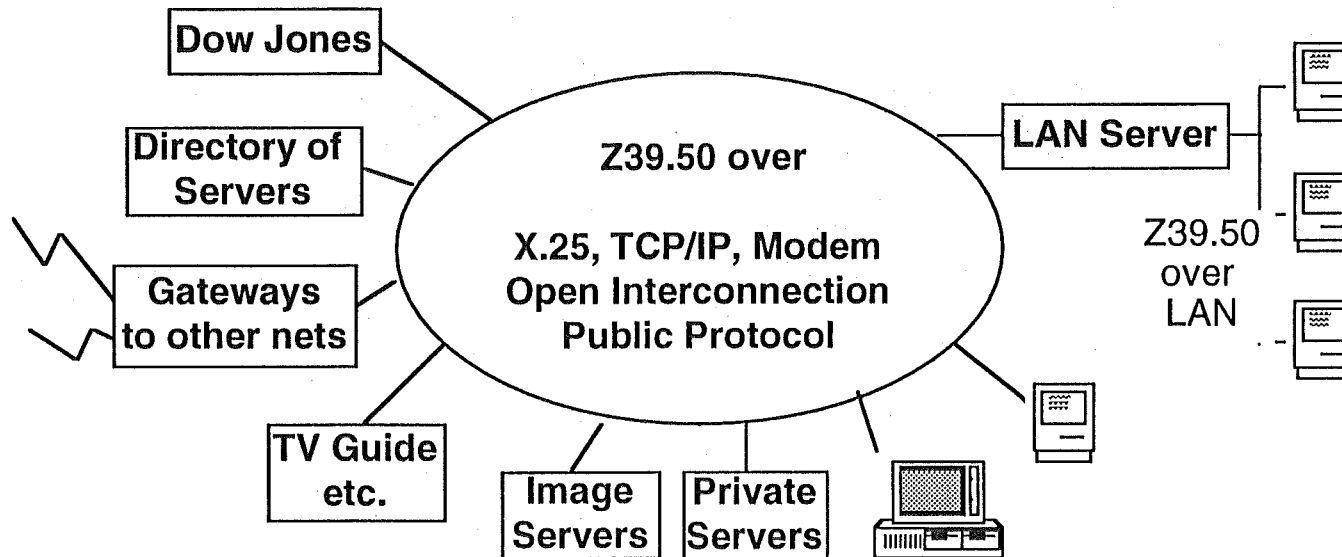- Online Services: Service Bureau of Publishers

What I really want...

- My personal information to be accessible

- Published information should find me

- Usable anywhere

- Others can use what I have learned (if I want them to)

Electronic Information Delivery

Price

$250K-2M   **Mainframe -based**

$50K-250K   **LAN-based**

$10K-50K   **WAN-based**

- Client-server
- International standards
- Logging for accounting

1970's   1980's   1990's   **Time**

Wide Area Information Server Architecture

Dow Jones

Directory of Servers

Gateways to other nets

TV Guide etc.

Z39.50 over

X.25, TCP/IP, Modem Open Interconnection Public Protocol

LAN Server

Z39.50 over LAN

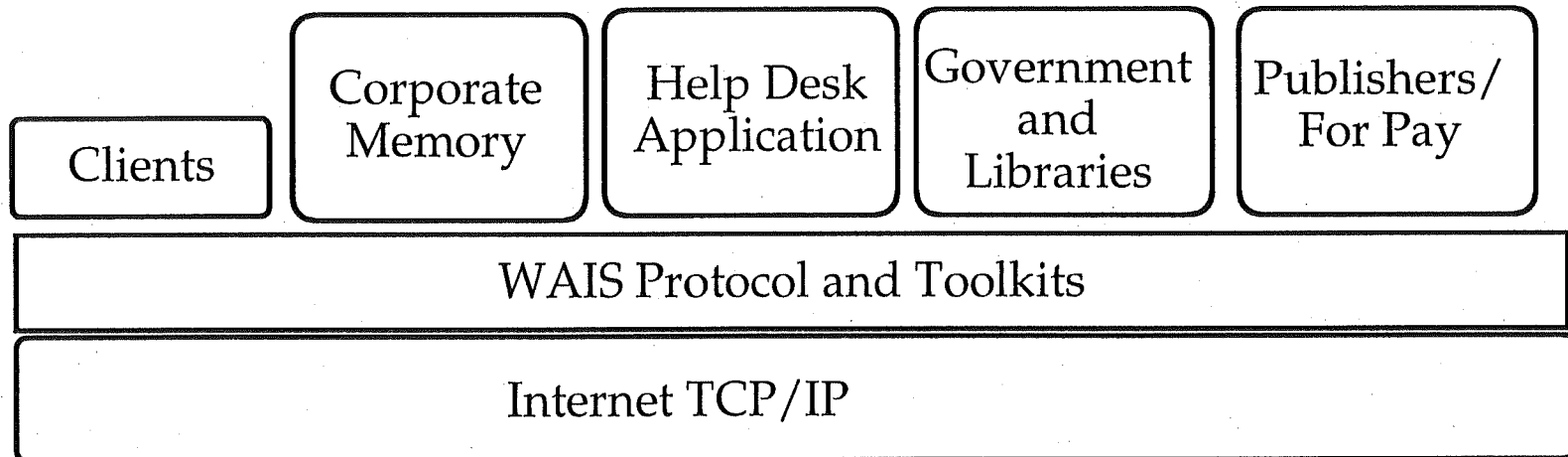Image Servers

Private Servers

Easy point-and-click interface to worldwide information

4

WAIS Inc:
Network Publishing

- Founded June 1992 from 1990 Consortium of Apple/ Thinking Machines/DowJones/KPMG

- Technology: 2 Founders from Supercomputing

- Internet: Experience in Building an Internet System

- Publishing: 2 Founder from Publishing

WAIS Inc Position

- **WAIS Inc Brings**
  - **Application Protocols**
  - **Database Server Technology**
  - **Wide Area Network Expertise**
- **Work with Industry Partners**

Clients	Corporate Memory	Help Desk Application	Government and Libraries	Publishers/ For Pay

WAIS Protocol and Toolkits

Internet TCP/IP

WAIS Inc Server

- Mixed Natural Language and Boolean

- Accounting for Billing

- Restricted Access

- Data in original formats

- Popular Unix Platforms

WAIS Navigation

- **Optimized for Wide Area Networks**

- **Natural Language with Relevance Feedback**

- **Personal/Enterprise/Wide Area Information**

- **Interactive Search⟶ Agents**

"Chaining" of Questions to Follow a Tangen

Question-1

Look for documents about

recent developments in personal computers

[Run]

Which are similar to In these sources

≡ Technology : Co   ⦿ Wall St. Journal

Results

- ▤ *** International: Bull Agrees to Pay Zenith $15 Million to En
- ▤ *** AT&T Set to Announce Memorex Computer Accord
- ▤ *** Technology Brief -- International Business Machines: Pri
- ▤ *** Business Brief -- Data General Corp.: Four Models Are Un
- ▤ *** Technology : Computer Firms See the Writing on the Scree
- ▤ *** Retailing: Businessland Enters Japan, Aided by 4 Big Loca
- ▤ ** Co
- ▤

Question-2

Look for documents about

[Run]

Which are similar to In these sources

▤ Retailing: Busin   ⦿ Wall St. Journal

Results

- ▤ *** Retailing: Businessland Enters Japan, Aided by 4 Big Loca
- ▤ ** What's News -- Business and Finance
- ▤ ** Technology : Computer Makers Agree on a Standard For N
- ▤ * Inside Track: Businessland Directors Take a Loss And Tra
- ▤ * Technology & Health: Businessland To Report Loss For 3r
- ▤ * Technology : U.S. Computer Maker Takes on NEC on Its Ow
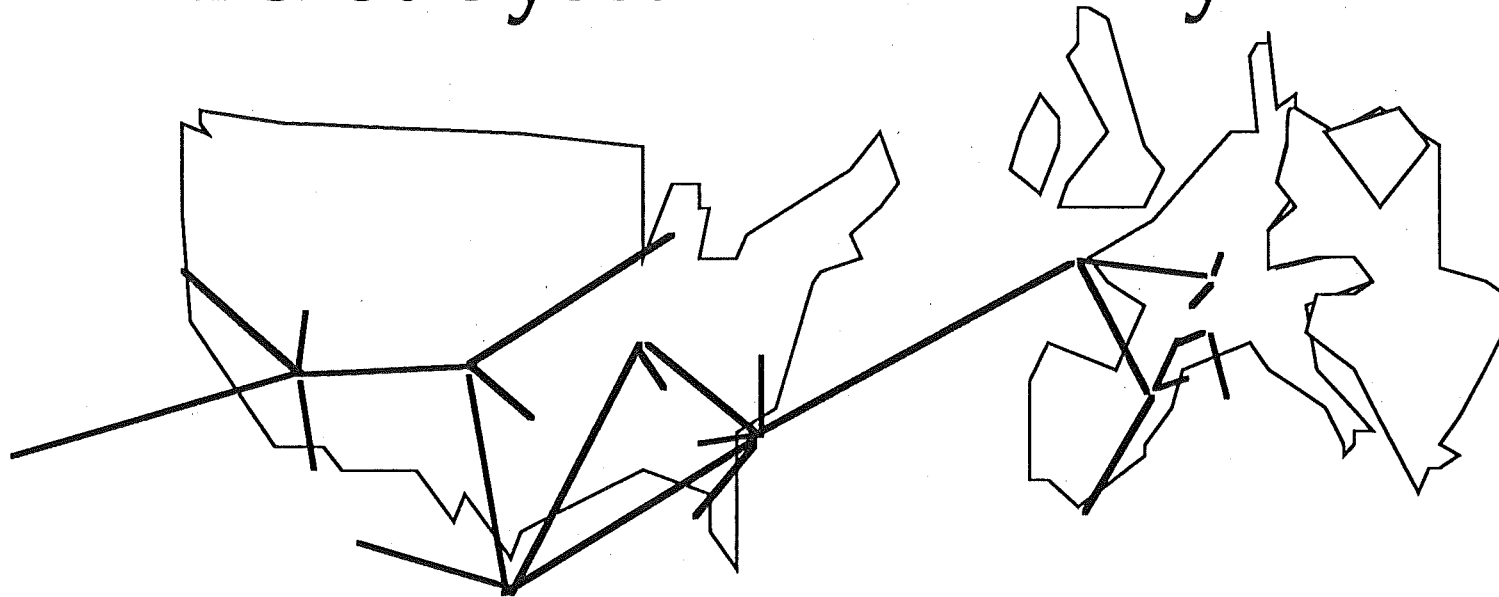- ▤ * Technology : Computer Firms See the Writing on the Scree

Digital Libraries and Network Publishing

Large Networks   +   Too Much Information   = **A Problem**

WAIS Can Help Users **Find Critical Information**

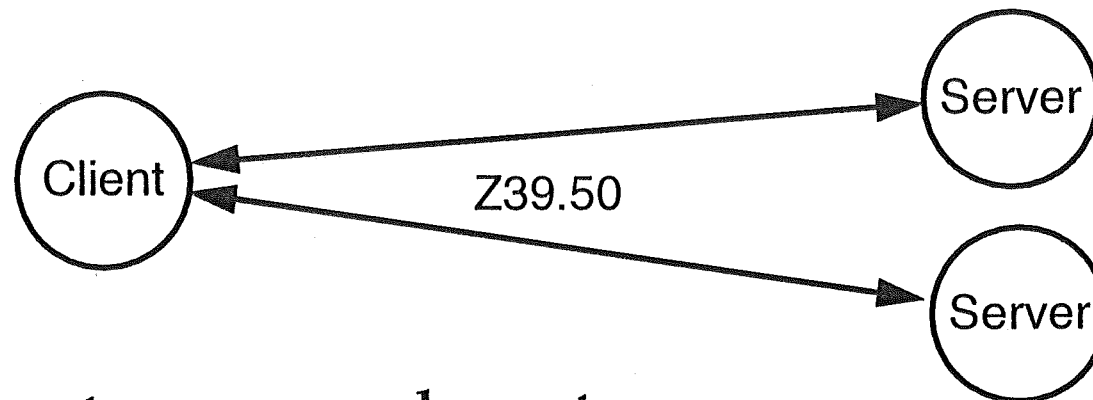WAIS Can Help "publishers" **Deliver Information to Users**

Perot Systems WAIS System

- Corporate Information
  - Resumes, Company Policies, Presentations, Contracts, Proposals, Phone book
- Published Info
  - CDROM's, Internet resources

Upcoming Searching Extensions

- Integration of TREC/Tipster Research
- Other commercial search engines
- Learning based searches
- Integrated Searching and Browsing (gopher-style)
- International character sets and Unicode
- New protocols (Z39.50-v2, URL, RSA, Search Syntax)

The WAIS Protocol *is* WAIS

Client → Server

Client ← Z39.50 ← Server

- **Supports any search syntax**

- **Supports sophisticated clients -- puts intelligence in the user's hands**

- **Clients can run on any platform**

- **Multiple servers in a single search**

- **Retrieve any kind of data: text, graphics, video,...**

How Standard Protocol
can Provide Security

- Users do not login to server, but search only through application layer protocol (Z39.50).

- Server controls access to data.

- Authentication and Encryption

  - Public Key Encryption

  - Kerberos (WAIS Integration by MCC)

- Enables privacy, billing, and authentication

Networked Back of the Book Index: Searching

- When you know what you are looking for
- Manual indexing ———> full indexing
- Advanced navigation: topic clustering, query analysis, relevance feedback
- Interactive through gigabytes

Navigation Techniques: Paper

- Alphabetical Listings (dictionary, Encyclopedia)

- Indices (back of the book and Readers Guide)

- Table of Contents (outlining)

- Citation index

- "Tree of Knowledge"

- Have you read any good books lately?

Navigation Techniques: Computers

- Hierarchical:
  - File Folders, FTP, Internet Gopher
- Filename search:
  - Unix "find", Mac "find file", Internet Veronica
- String search:
  - Grep, ON Location
- Boolean query systems (AND OR NOT):
  - Dialog, Mead Data
- Static Hypertext links (see also pointers):
  - World Wide Web

Navigation Techniques: WAIS

- Natural language questions and relevance feedback as well as Boolean
  - Question-answer dialog
  - Similar to Newspapers: "More on page 5"
  - Dynamic Hypertext Links
- 2 level search:
  - Directory of servers
  - Servers themselves